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Letter dated 26 January 2007 from the Permanent Representative of Iceland to the United Nations addressed to the Secretary-General

I have the honour to transmit herewith a summary of the conclusions and recommendations of the International Seminar on the Hydrogen Economy for Sustainable Development, held in Reykjavik on 28 and 29 September 2006 (see annex).

I should be grateful if you would have the present letter and its annex issued as a document of the fifteenth session of the Commission on Sustainable Development.

(*Signed*) Hjálmar W. **Hannesson**
Permanent Representative

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International Seminar on the Hydrogen Economy for Sustainable Development

The ***International Seminar on the Hydrogen Economy for Sustainable Development*** was co-organized by the Government of Iceland and the United Nations Department of Social and Economic Affairs at the Nordica Hotel in Reykjavik, Iceland, on 28-29 September 2006 and attended by 82 participants from 20 countries.

The seminar was convened to provide an opportunity for energy policy makers and representatives from governments, industry and academia from both developed and developing countries to exchange information on the recent progress in the development and application of hydrogen energy technologies. Conditions for energy development in various developing countries were introduced and possibilities for expanded international cooperation were explored.

As a result of the discussions, participants adopted the following summary of conclusions and recommendations:

The need for diversification and expansion of energy for sustainable development

1. Global primary energy demand is expected to grow by more than 50 per cent over the next 25 years. Demand for energy services is growing fast, in particular in the developing countries with rapidly expanding economies. Fossil fuels are expected to continue to provide some 80 per cent of the energy needed, with serious environmental consequences, including atmospheric pollution and emissions of carbon dioxide (CO_2) and other greenhouse gases. Despite strong growth in conventional energy production and use, energy poverty and disparity in energy services are expected to continue into the foreseeable future, with 1.4 billion people expected still to be without access to electricity in 2030. This development path is unsustainable and alternative energy resources and technologies must be found if the world is to meet the energy needs of the present generation in a sustainable manner.

The recent progress and trends in hydrogen energy technology

2. Production and use of hydrogen (H_2) offers alternative energy pathways to sustainable development. Hydrogen can be produced by any primary energy source providing a flexible energy carrier which can substitute fossil fuels. Water electrolysis and natural gas reforming are currently the technologies of choice in commercial hydrogen production. Both are proven technologies that can be used in building a hydrogen energy infrastructure for the transport sector. Hydrogen can also be produced by gasification of coal or biomass.

3. The recent development of fuel cell technology opens new opportunities for the use of hydrogen fuel. Fuel cell technology provides for a wide range of applications, from powering vehicles to supplying decentralized electricity and heat with potentially significant environmental advantages over other energy technologies.

4. A hydrogen economy may offer an attractive opportunity for countries that lack indigenous fossil fuels but possess ample renewable energy resources. For instance, some small island states possess significant geothermal or other renewable energy resources which could be developed to produce electricity as well as hydrogen to substitute for imported fossil fuel. However, the costs of hydrogen energy technologies will have to be significantly reduced in order to make them more attractive for developers and investors.

5. Hydrogen can be produced as a secondary product, making economic use of spare electricity capacity of geothermal power plants, hydropower stations or wind farms.

Critical challenges to advancing a hydrogen economy

6. Various technological, institutional and economic hurdles for developing the potential of hydrogen energy were discussed. In industrialized countries, the most fundamental technological and economic challenges to introduce and promote the use of hydrogen in transportation include: (a) development and introduction of cost-effective, safe and durable fuel cell and hydrogen storage systems and expansion of their capacities; (b) development of the decentralized infrastructure necessary to make hydrogen use a sufficiently attractive option for light-duty-vehicle users; (c) reduction of the costs of electrolyzers; (d) significant reduction of the cost of hydrogen production from renewable energy sources; (e) the effective sequestration of the CO_2 by-product of hydrogen production from coal; and (f) public education and capacity building. Hydrogen safety, from both a technological and a societal perspective, will also be one of the major hurdles that must be overcome in order to achieve a hydrogen economy.

7. The market uptake and widespread deployment of hydrogen-based energy systems require visionary thinking, intensive R&D efforts, and increased cooperation across academic disciplines, industrial sub-sectors and national borders.

8. Participants from small island developing states emphasized the high vulnerability of small island economies, in particular of those islands that rely completely or almost completely on imported energy. Participants emphasized the importance of the development of indigenous renewable sources of energy, in line with the Barbados Programme of Action and the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States.

Priority areas for international cooperation and participation of developing countries

9. The need to further develop the hydrogen economy in support of the three dimensions of sustainable development was emphasized, namely economic development, social development, and environmental protection.

10. Participants called upon Governments and the hydrogen energy industry to establish policy frameworks conducive to the development of a hydrogen economy.

11. The importance of the private sector and public-private partnerships was emphasized for advancing hydrogen energy research and commercialization.

12. The role of international energy technology partnerships such as the IPHE for the development of the hydrogen economy and collaborative projects was noted. Participants called on the IPHE to consider expanding its membership and cooperate with developing countries.

13. The use and development of human resources was discussed. Participants shared experiences on outsourcing research and development work on hydrogen energy technology to developing countries and to countries with economies in transition, some of which have considerable research capacities. International R&D outsourcing can offer cost benefits to technology developers.

14. Participants expressed interest in establishing hydrogen demonstration projects in developing countries and to introduce hydrogen applications to development projects in the field of energy. The support of geothermal projects in developing countries by the Government of Iceland was welcomed and its intention to explore the possibility of including hydrogen applications in such projects in small island developing states.

15. Establishment of international codes and standards was recognized as a precondition for the development of the hydrogen energy industry and investments in hydrogen energy infrastructure for international trade.

16. The call for accelarated development in development countries made at the World Summit on Sustainable Development in Johannesburg, 2002, was endorsed by the participants, who called for dissemination and deployment of affordable and cleaner energy technologies, as well as the transfer of such technologies, in particular to developing countries, on favourable terms.

17. The need for continued capacity building in cleaner energy systems was stressed, including the production and utilization of hydrogen, and the early transfer of these technologies to developing countries. The importance of regional cooperation was noted in this respect.

18. Information was exchanged on national initiatives and programmes of developing countries to test and to develop hydrogen energy technologies. Participants encouraged expanded networking, North-South and South-South cooperation among centers of excellence and research.

19. It was noted that the development of a hydrogen energy infrastructure is highly capital-intensive. Participants called for the provision of the necessary financial and technological assistance to developing countries.

20. Participants recommended that the Government of Iceland consider the submission of the conclusions and recommendations of the seminar to the Commission on Sustainable Development of the United Nations in the year 2007.

21. Participants expressed their gratitude to the Government of Iceland for initiating and co-organizing the seminar together with the United Nations, and to the Government and people of Iceland for the warm welcome and hospitality enjoyed by all participants.